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ABSTRACT

A study examined how beliefs and attitudes influence the processing of information: people tend to distort contradictory information to make it consistent with their pre-existing beliefs and attitudes and to use it to bolster their initially held convictions. The study addressed the degree to which people believed that HIV causes AIDS. Subjects, 27 female and 13 male undergraduate students in an educational psychology course, rated the degree to which they agreed with the statement, "HIV causes AIDS," using a 9-point Likert type scale. Of the 40 subjects, 28 believed that HIV causes AIDS. Subsequent data analyses were based only on responses of these 28 subjects. Tape-recorded responses to text, as they read it aloud, from the 28 students were transcribed verbatim. Twenty-four hours after reading the text, subjects were asked to complete a test of free recall of information presented in the text. Results indicated that subjects employed strategies that helped to develop intrasentential ties significantly more on the paragraphs that contained information at odds with their existing beliefs than they did on paragraphs that presented information consistent with those beliefs. Findings revealed that the students tended to accept "confirming" evidence at face value while subjecting "disconfirming" evidence to harsher judgment. (Includes 2 tables of data; contains 10 references.) (CR)

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Reading Processing Strategies Employed to Comprehend Text Both Consistent and Inconsistent with Subjects' Prior Beliefs

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Both Consistent and Inconsistent with Subjects' Prior Beliefs

Objectives and Theoretical Framework

Literally hundreds of studies have been conducted by social psychologists to determine how beliefs and attitudes influence the processing of information. As early as 1943, Levine and Murphy reported that individuals will learn and remember best that information that is consistent with their existing attitudes. Subsequent research conducted by both social and educational psychologists has demonstrated repeatedly that people's typical response when confronted with information at odds with their attitudes or beliefs is one of "biased assimilation" and "attitude polarization" (Garner & Chambliss, 1995; Lord, Lepper & Ross, 1979; Miller, McHoskey, Bane, & Dowd, 1993). In other words, people tend to distort the contradictory information to make it consistent with their pre-existing beliefs and attitudes, and to use it to bolster their initially held convictions.

The controversial issue addressed in the present study dealt with the degree to which people believed that HIV causes AIDS. Results of previous studies have revealed that people's pre-existing beliefs about how AIDS is transmitted and about the HIV-AIDS relationship affect not only how much and what type of information is recalled from a text designed to change those beliefs (Kardash & Scholes, 1995), but also the particular type of conclusions they draw based on what they read (Kardash & Scholes, submitted). The present study extends this line of research by investigating whether these previously reported effects of people's beliefs on recall and interpretation of persuasive or "dual-positional" text might be explained by differences in the types of processing strategies readers employ to comprehend text information that is both consistent with and contrary to their pre-existing beliefs. Our study was modeled methodolgically after Pritchard's (1990) study of the effects of cultural schemata on the type and frequencies of strategies used to process text that was either culturally familiar or unfamiliar. Using think-alouds, he found that readers used strategies that developed awareness of the passage and that established intrasentential ties more often for culturally unfamiliar than for culturally familiar passages. In contrast, strategies that established intersentential ties within the passage and utilized relevant background knowledge were used significantly more often for the culturally familiar rather than culturally unfamiliar passage.

In the present study, we asked subjects to "think aloud" as they read a text that presented evidence both confirming and contradicting their pre-existing beliefs regarding whether or not HIV causes AIDS. Based on the theoretical assumption that people's pre-existing beliefs or "social theories," like their specific culture, can serve as a "schema" (Dole & Sintra, 1994; Kardash & Scholes, 1995) we expected that the type and frequency with which particular strategeies would be employed to both comprehend and to monitor one's comprehension of the text (cf., Baker, 1985) would differ as a function of whether the information they were reading at a particular point in the text either confirmed or contradicted their prior beliefs. Specifically, we expected that when subjects read information that contradicted their idiosyncratic beliefs about the HIV-AIDS relationship (i.e., was unfamiliar), they would rely more on strategies related to: developing awareness, establishing intrasentential ties, and evaluating surface features of the text such as its propositional cohesiveness. In contrast, when subjects read information that was consistent with their prior beliefs (i.e., was familiar), we expected them to rely more on strategies such as establishing intersentential ties, using prior knowledge, and evaluating the text's external consistency (Baker, 1986; Pritchard, 1990).

Method

Subjects and Design

Twenty-seven female and 13 male undergraduates enrolled in an educational psychology course rated the degree to which they agreed with the statement, "HIV causes AIDS," using a 9-point Likert type-scale (1="totally confident that this is true, " 5="have no idea whether this is true or false, " 9= "totally confident that this is false"). Of the 40 subjects, 28 believed that HIV causes AIDS. Given this skewed distribution, subsequent data analyses were based only on reponses of the 28 subjects who believed HIV causes AIDS. Type of text paragraph (supports claim that HIV causes AIDS vs. refutes claim that HIV causes AIDS) served as a within-subjects factor in the study.

Materials

Text. The text was based on a debate between a reasearch team led by Blatter from the NIH, and Duesberg, a professor of molecular biology from Berkeley, on the relationship between HIV and AIDS that appeared in Science. Eight of the text pararaphs (28 sentences) favored Blattner's view that HIV is the sole cause of AIDS; nine of the paragraphs (29 sentences) advanced arguments supporting Duesberg's view that HIV does not cause AIDS. Both sides supported their respective views with evidence from epidemiological studies, incidences of blood-transfusion-associated AIDS cases, incidences of mother-to-child perinatal transmission of AIDS, and incidences of drug-related AIDS cases. The text was structured so that Blattner would present an argument supporting the view that HIV causes AIDS, that specific argument would then be refuted by Duesberg. The second argument and its accompanying evidence would then be presented in the same order. We did not counterbalance order of presentation due to the likely disruptive effect such counterbalancing would have on the text's readability. The 1354-word text had a readability of approximately 12th grade.

Ancillary measures. All subjects rated the text in terms of its interest, difficulty, and familiarity (1= "very interesting, easy, and familiar," respectively, and 4 = "very dull, difficult, and unfamiliar," respectively). In addition, all subjects completed a 20-item test of verbal ability (French, Ekstrom, & Price, 1963) in order to determine whether any differences in strategy use could be attributed to differences in verbal ability.

Procedures

Subjects met individually with one of the researchers. Each subject had completed rating the HIV-AIDS item (which was embedded in a 40-item survey about AIDS) at home and approximately 48 hours before the experimental session. Subjects were told that the purpose of the study was to examine the readability of the text, and that their task was to express all thoughts they had aloud as they read through the text. The text was presented one paragraph at a time so that subjects had the opportunity to express any overall thoughts on each paragraph as it was presented and before turning the page to reveal the next paragrpah. Subjects were allowed to "lookback" at previous paragraphs whenever they desired. The researcher modeled "thinking aloud" for each subject, and each subject practiced thinking aloud on two paragraphs of an unrelated passage prior to being given the experimental text. Subjects' verbalizations were tape recorded. Immediately following the think aloud, subjects rated the text in terms of its interest, difficulty, and familiarity, and then completed the test of verbal ability. Twenty-four hours after each subject completed the first session, he/she returned and was unexpectedly asked to complete a test of free recall of information presented in the text.

Results

Scoring

Think-aloud protocols. The tape-recorded responses from the 28 subjects were transcribed verbatim. Transcriptions were scored using Pritchard's (1990) previously identified categories of processing strategies as a model. Pritchard's taxonomy comprised 22 individual strategies that were collapsed into five categories: developing awareness, accepting ambiguity, establishing intrasentential ties, establishing intersentential ties, and using background knowledge. Our protocol analyses yielded six strategies in addition to those identified by Pritchard; these additional strategies were assigned to two new categories: reader judgment/decision and ineffective text processing. All protocols were analyzed by both researchers; diasgreements were resolved by consensus.

Analyses

Table 1 presents the mean number of times each individual strategy was used by paragraph type. Individual strategies were then collapsed and totaled to form seven general strategy categories. These data are presented by paragraph type in Table 2. Brief descriptions of each of the seven categories with accompanying examples are : (A) Developing Awareness-- the subject expresses an awareness of the experimental task, assesses his/her level of concentration, or states an understanding or lack of understanding of a portion of the task-- "I'm still not getting the HIV without AIDS stated here"; (B) Accepting Ambiguity--the subject indicates how he/she plans to deal the lack of understanding expressed in A-- "I may have to rethink what I said before," (C) Establishing Intrasentential Ties"-- the subject begins to resolve ambiguity by examining individual words and sentences--"So, if you can have a disease like TB, and it doesn't mean that you have AIDS, you don't have HIV," (D) Establishing Interesentential Ties-- the subject makes connections between paragraphs and sentences as well as expanding beyond the information in the text-- "I think if I read a little further I probably would have understood what he was saying," (D) Using Background Knowledge--the subject brings his/her own previously

known information about AIDS to the text in order to better comprehend what he/she is reading-- "I read there's, uh, not too long ago, about there being people who actually have HIV-positive but did not have AIDS," (E) Reader Decision/Judgment-- having employed the strategies described above in order to comperehend the text, the subject makes a decision about what he/she is reading--"Duesberg presents quite a presumptuous argument," (F) Ineffective Text Processing-- the subject unknowingly totally misinterprets information presented in text-- "epidemiological--so, it's a skin study."

A 2 Paragraph Type x 7 Category Type within-subjects ANOVA on the data presented in Table 2 yielded significance for the main effects of Category Type, F (6, 162) = 16. 36, $p < .001$, and the Paragraph Type x Category Type interaction, F (6, 162) = 6.99, $p < .001$. (Marginal significance was obtained for the main effect of Paragraph Type, F (1,27) = 3.22, $.05 < p < .10$.) Analysis of simple main effects for the Paragraph Type x Author Type interaction revealed that the interaction was due primarily to the difference in the mean number of times that subjects reported using strategies to develop awareness, establish intrasentential ties and make judgments/decisions as a function of paragraph type. Specifically, subjects used strategies for developing awareness more on the Blattner paragraphs than on the Duesberg paragraphs, F (1,27) = 4.96, $p < .05$. By contrast, subjects made intrasentential ties and also more judgments on the Duesberg rather than Blattner paragraphs, F (1, 27) = 5.87, $p < .05$, and F (1,27) = 20.95, $p < .001$, respectively.

Discussion

The results of this study provide evidence that pre-existing beliefs can influence the strategies that readers use to comprehend and monitor their understanding of information that both confirms and contradicts those beliefs. These findings both replicate and extend Pritchard's (1990) earlier finding that" reading is a content-specific activity; that is, when the content of reading materials changes, processing behavior changes as well" (p. 291). As expected, subjects employed strategies that helped to develop intrasentential ties significantly more on the paragraphs that contained information at odds with their existing beliefs than they did on paragraphs that presented information consistent with those beliefs. They especially tended to paraphrase more on the paragraphs espousing the view that HIV does not cause AIDS. This could be due to their need to express what they had just read in order to understand what, for them, was apparently a foreign idea. Subjects also expressed judgments or decsisions signficantly more on the Duesberg compared to Blattner paragraphs. Examination of the means for the individual strategies within this category revealed that subjects were especially prone to diasgree with information presented in the Duesberg paragraphs. This finding is strikingly similar to Lord et al.'s (1979) finding that subjects tended to accept "confirming" evidence at face value while subjecting "disconfirming" evidence to harsher judgment. We are presently in the process of examining the degree to which the differences in processing strategies reported here are linked to differences in delayed recall of text information as a function of paragraph type. In addition, we are also examining whether differences in subjects' verbal ability, or ratings or text interest, difficulty, or familiarity interacted with paragraph type to influence the type of strategies our subjects employed.

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Table 1

Means and Standard Deviations for Individual Strategies as a Function of Author

	Paragraphs			
	Blattner		Duesberg	
Strategy	M	SD	M	SD
A. Developing awareness				
1. Refer to experimental task	0.89	1.23	0.21	0.57
2. State loss of concentration	0.14	0.36	0.79	0.80
3. Syntactic failure to understand	1.04	1.95	0.25	0.79
4. Lexical failure to understand	0.93	1.02	0.54	0.79
5. State understanding of a portion of text	0.25	0.52	0.04	0.19
B. Accepting ambiguity				
6. Formulate a question	1.25	1.53	1.18	1.74
7. Suspend judgment	0.39	0.69	0.54	0.96
C. Establishing intrasentential ties				
8. Gather information	0.04	0.19	0.14	0.45
9. Reread	0.11	0.32	0.11	0.32
10. Paraphrase	1.39	1.34	2.00	1.59
11. Use context cues to interpret a word/phrase	0.07	0.26	0.07	0.26
D. Establishing intersentential ties				
12. Refer to a previous sentence	0.04	0.19	0.07	0.26
13. Draw inference from text	2.18	2.40	2.82	4.09
14. Refer to a previous paragraph	0.43	0.84	0.43	0.74
E. Using background knowledge				
15. Use background knowledge of discourse format	0.29	0.54	0.14	0.36
16. Visualize	0.00	0.00	0.04	0.19
17. Relate sentence to personal experience	0.79	1.17	0.50	1.07
18. Relate to background knowledge	2.89	2.02	2.96	2.41

Table 1 (cont.)

Means and Standard Deviations for Individual Strategies as a Function of Author

	Paragraph			
	Blattner		Duesberg	
Strategy	M	SD	M	SD
F. Judgment/Decision				
19. React to an author's style or text's surface features	0.39	0.69	0.64	1.16
20. Respond affectively to text content	1.54	1.35	1.43	1.48
21. Disagree with text information	0.50	0.96	3.43	2.44
22. Agree with text information	1.79	1.83	1.14	1.69
G. Ineffective text processing				
23. Illusion of knowing	0.14	0.45	0.07	0.38
24. Failure to process	0.86	0.85	0.71	0.90

Table 2

Means and Standard Deviations for Categories of Strategies as a Function of Author

	Paragraph					
	Blattner		Duesberg		Total Text	
Category	M	SD	M	SD	M	SD
A. Developing awareness	3.25	3.54	2.04	1.90*	5.07	4.68
B. Accepting ambiguity	1.64	2.00	1.71	2.34	3.36	3.99
C. Establishing intrasentential ties	1.61	1.45	2.32	2.04*	3.93	3.17
D. Establishing intersentential ties	2.64	2.82	3.32	4.75	5.96	7.29
E. Using background knowledge	3.96	2.53	3.64	2.71	7.61	4.61
F. Judgment/Decision	4.21	3.05	6.64	3.43**	11.04	5.94
G. Ineffective text processing	1.00	0.94	0.79	0.92	1.79	1.42

Note: *$p < .05$, **$p < .001$, two-tailed tests